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ENTOMOLOGICAL NEWS

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Habits of Megathymus stephensi Skin. and Notes on other Megathymus (Lepid.: Hesperidae).

By CURTIS BROWN and JAMES CREELMAN, San Diego, California.

In a recent Bulletin of the Southern California Academy of Sciences (May-August, 1934), John Adams Comstock and Commander Charles M. Dammers published a very excellent account of the life history of *Megathymus stephensi*. The present paper is intended to add a few facts about the habits of *stephensi* and to present a brief discussion of other *Megathymus* skippers.

As Comstock and Dammers have shown, *stephensi* larvae are agave (*Agave deserti*) feeders. *Stephensi*, like all other *Megathymis*, is an exceedingly fast flyer. This adds greatly to the difficulty of capture. Fortunately, *stephensi* has several unusual habits which makes it possible to obtain good specimens without the necessity of rearing them.

During the day time *stephensi* occasionally stops and rests upon its beloved agave. At this time it can be netted. However as soon as it is netted, the rapid motion of its wings causes the scales and body hairs to be rubbed off. Exceedingly poor specimens result. The junior author caught 74 specimens in this way (Box Canyon, Sept. 28 and 29, 1933). Out of the lot only one or two were in fair condition.

A peculiar and unusual habit of the male of this skipper is that it drinks water at a definite time of the day. About sundown it travels to the nearest water and drinks from the moist sand. Just as the shadows cover the water, the skipper flies back to the hills to its roosting place. On Sept. 29, 1934, the authors spent a day at San Felipe Creek. During the day only one *stephensi* appeared for water. Just before sundown they began to come to the water by the hundreds. They were lighting on our pants, nets and jars. They were tame and bold. The mad scramble for water lasted about 45 minutes. They disappeared even quicker than they came. I paused for a few

moments to empty my jar; and when I looked for more, they were gone. Not a single *stephensi* was in sight where just a few moments before there were hundreds. It was a butterfly collector's dream—a rare butterfly just waiting to be caught!

Where did they go after they left the water? Did they roost in the nearby trees or did they go back and sleep on the agave? No *stephensi* were located on the bushes (cats-claw, bean mesquite, etc.) that were next to the creek. They must have gone back to the hills among the agave. Two hours of night searching at Box Canyon (about three to four miles from the water) disclosed that *stephensi* was not to be found on agave. They could not disappear; they had to be somewhere—but where? Accidently it was solved. In going back to the car, the shortest, easiest way led along the bottom of the dry wash in Box Canyon. Just after reaching the bottom of the canyon the junior author found one perched on the limb of a bean mesquite. The specimen was sound asleep and never moved. This was an ideal way of collecting them; they did not move or flutter while being killed.

Later exploring showed: (1) *Stephensi* sleeps on the common bushes of the region and very occasionally on buckwheat, etc.; (2) it very much prefers a bush at the bottom of a canyon to one on the side of a hill; (3) it does not sleep on agave, its food plant; (4) it always sleeps on the outside of the bush; (5) it may be on any side or any height on the bush. So far no females have been taken in this way.

At Box Canyon (Sept. 29, 1934) two hours of night work yielded us about 20 perfect specimens. Either Box Canyon itself or any of the side canyons leading into it contained specimens. Admittedly it was hard work. However, it is the only way in which good specimens can be caught. At the water we were able to catch them direct into a cyanide jar. However, the fluttering of their wings caused a little damage to their delicate wing scales.

At sundown a week later (Oct. 6, 1934) *stephensi* were not nearly as abundant at San Felipe Creek as they were the previous week. Two weeks later only one speciman showed up for water. Each time when checking at Box Canyon it was found that *stephensi* was just as abundant as ever. The authors have

come to the conclusion that male *stephensi* only goes for water very shortly after it emerges.

As yet no method of obtaining perfect females (outside of raising them) has been found by the authors. In the day time the females fly close to the ground and flutter around the agave. Whenever they are sighted they are easier to capture than the males. However, the net causes damage to their wings. The authors believe that perfect females can be obtained by a careful search at night time.

A reared specimen is always more perfect than one caught. Comstock, Dammers, the authors and others have succeeded in breeding and raising this species. The specimens caught at night time compare fairly closely in perfection with those raised.

Apparently others when collecting *Megathymis* specimens have had similar troubles in obtaining good specimens. Mr. Bell, of Flushing, New York, kindly informed me that Jacob Doll, who collected the type of *Meg. neumoegeni,* also found difficulty in obtaining good specimens. He likewise collected his specimens direct into a cyanide jar.

Mr. Leussler, in describing the difficulty of capturing *M. leussleri,* states, "*M. leussleri* is a powerful flier, particularly the males, and when alarmed by the approach of a collector, makes a bee line for the next county with the speed of an express train. They are so active that after a few days on the wing they are wrecks with torn wings, fringes gone, and scales more or less rubbed off. The thing to do is to be on the ground when they first make their appearance; and that is hard to do because the season is earlier in some years than in others."

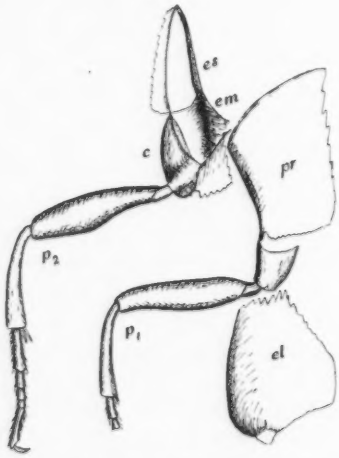
Fortunately Comstock and Dammers have now worked out the life history of *Meg. yucca navajo* (Bull. Southern Calif. Academy of Sciences, May-Aug., 1934). It is now possible to rear this species which was previously very difficult to obtain. The authors have collected several *navajo* larvae on *Yucca mohavensis* Sarg. shoots located in San Felipe Valley (San Diego County). We hope to be on the ground at the time they are supposed to emerge (March) and determine whether they also go for water at dusk. Since *navajo* only attacks yucca shoots, it will never be found in great numbers at any one locality.

The Type Specimen of Rhipiphorus stylopides (Coleop.: Rhipiphoridae).

By E. Rivnay, Ph.D., Rehoboth, Palestine.

In the several collections of Rhipiphorids which I examined during my revision of this family for North and Central America,* various species were labeled "stylopides" and from the short original description it was hard to identify the real species. Therefore, I postponed its re-description until after I had examined the type specimen. At that time I was uncertain as to where the type was and whether it still existed—hence the statement "Type unknown." Recently, while traveling through some parts of Europe, I searched for it and found its remains in the British Museum. I thought it worth while to draw whatever organs there existed and reproduce them in a journal which is more available to the American student, who is no doubt more interested in this species than are others.

The following is the original description by Newman in the Entomological Magazine V, p. 376:



Explanation of Text Figure. *Rhipiphorus stylopides*, Newman, c=coxa; el=elytron; em=epimeron; es=episternum; p_1=anterior right leg; p_2=middle right leg; pr=pronotum.

* Mem. 6. Am. Ent. Soc., 1929.

"*Myodites stylopides*—Nigra, scabra, parce pilosa; os ferrugineum: elytrorum spices albidi: metaloe hyalinae irides-centes; costa fusca.

"Corp. .125 unc.; lat. .05 unc.

"Inhabits North America; Mr. Doubleday took a single specimen at Alton." (No doubt Alton, Illinois.)

Rhipiphorus walshi Lec. fits in very well with this description and I hoped the type specimen of *Rh. stylopides* would reveal some characteristics by which the two would be distinguished from one another or else made synonyms of each other. It is most regrettable, however, that those organs bearing the identification characters such as the head, antennae, hind legs, wings, etc., are missing. Of the entire specimen only the following organs are left: right foreleg (last three tarsal segments missing); right half of the pronotum; right middle leg attached to epimeron and episternum of the mesothorax; and right elytron with apex broken off. The color of these is dark brown; there is no locality label.

It is difficult to establish an identity of a species belonging to the genus *Rhipiphorus* on these organs alone. However, it is certain from both the original description and from the remains of the type specimen that *Rh. stylopides* Newman is very closely allied to *Rh. walshi* Lec., if not identical with it.

Cecropia Feeding on a Peony (Lepid.: Saturniidae).

In August, 1928, I noticed that one of my Chinese peonies (*P. albiflora* var.) was almost defoliated, and on investigating found a large Cecropia larva on it. About a week later the larva disappeared, and though there was an apple tree quite near and a lilac hedge still nearer, I could not find the cocoon on either of them, and it was certainly not on the stems of the peony plant. I do not know whether a record of this species feeding on one of the Ranunculaceae is new, but it seemed interesting in view of the notorious fastidiousness of caterpillars in their choice of food plants that this one should depart from the tradition of his race.

I have been on the watch ever since that time for a reappearance of a Cecropia on my peonies, but have never found another.

A. P. Saunders, Hamilton College, Clinton, N. Y.

A New Genus and Five New Species of Leafhoppers Related to Thamnotettix (Homop.: Cicadellidae).

By DWIGHT M. DELONG, Ohio State University, Columbus, Ohio.

Since 1903 several species of leafhoppers (Homoptera, Cicadellidae) which live upon cane (*Arundinaria tecta*) have been described as belonging to the genus *Thamnotettix*. As these are very similar in their generic characters but differ decidedly from the members of the genus *Thamnotettix*, a new genus is erected at this time to include six species previously described and five species which have not previously been described or named.

Genus **ARUNDANUS** nov.

Vertex produced and bluntly angled, flat, margin rather thick but distinct, not rounding to front. Venation strong, central anteapical cell greatly elongated constricted and divided by a cross vein at center. Outer anteapical cell usually elongated but narrow. Inner anteapical cell short and rather broad. Type of genus *arundineus* DeLong.

The first of this group of species was described in 1903 by Dr. Ball as *Thamnotettix shermani* (1) and was collected in North Carolina. In 1915 Crumb described *nacreosus* (2) from Tennessee and placed it in *Chlorotettix*. The other four species which have previously been named were described by the author. *Flavotinctus* and *crumbi* (3) were described in 1916 and placed in *Thamnotettix; proprius* was described as a member of *Thamnotettix* in 1918 (4) and *arundineus* (5) as belonging to the same genus in 1926. All four of these were described from material collected in Tennessee. Five undescribed forms are treated in the following pages.

On the basis of form and structure the members of this genus seem to be divided into small groups of closely related species. The largest of these comprises *crumbi, flavotinctus, arundineus* and *proprius*. Two closely related species of another type, *carolinus* and *latidens,* seem to be most closely related to this group. *Shermani* and *marginellus* form another group differing considerably from the previous forms in having a much blunter and broader head. *Rubralineus* seems to fit most closely with this later type. *Nacreosus* which has a sexually dimorphic color condition (white female, and orange male)

is most closely related to *carolinus* and *latidens* but is rather distinct while *parvulus* a very small pointed headed species, probably is most closely related to the *carolinus* type.

Arundanus marginellus n. sp.

In form and appearance resembling *shermani* but with distinct genitalia. Length 5-5.5 mm.

Vertex flat a little more than half as long at middle as width between eyes, bluntly angled.

Color: Tawny to gray, tinged with orange, a brownish waved line just above margin and a fainter one just below; margin between these two lines conspicuously white. Face dark tawny. Pronotum marked with four conspicuous longitudinal orange stripes. Elytra tawny to brownish with pale veins.

Genitalia: Female last ventral segment long with prominent lateral angles, posterior margin indented either side of a broad median rounded tooth which is produced as far as the lateral angles and is bifid at apex. Male valve broad, obtusely angled. Plates long gradually tapering to narrow acute tips.

Described from a large series of male and female specimens collected from cane *Arundinaria tecta* at Covington, Clarksville and Nashville, TENNESSEE, during June, July and August, 1915 and 1917. *Holotype* female, *allotype* male and male and female *paratypes* in author's collection.

Arundanus rubralineus n. sp.

Resembling *shermani* and *marginellus* more than the others in the group but differing in color and genitalia. Length 5 mm.

Vertex a little broader than long, bluntly and broadly angled.

Color: Vertex creamy white without black marginal lines on margin. Two broad bright orange red stripes arise either side of vertex and extend across pronotum and basal angles of scutellum, and a short pair behind eyes on either side crossing pronotum. Elytra bright tawny, veins conspicuously white, apices smoky, veins bordered with fuscous.

Genitalia: Female last ventral segment with prominent lateral angles between which the posterior margin is sinuately, shallowly, concavely rounded at the center of which is a deep, narrow incision extending two-thirds the distance to the base.

Described from a single female specimen collected at Florence, SOUTH CAROLINA, June 19, 1930, by O. L. Cartwright. *Holotype* female in author's collection.

Arundanus carolinus n. sp.

In coloration and appearance most closely resembling *flavotinctus* but smaller, more distinctly marked and with distinct genitalia. Length 5 mm.

Vertex bluntly angled, about one-fifth wider between eyes than length at middle, pronotum a little longer than vertex.

Color orange yellow, vertex with a heavy waved line just below and a paler waved line just above margin. Veins pale, not conspicuous.

Genitalia: Female last ventral segment with broadly rounded lateral angles, posterior margin broadly shallowly concavely rounded. Male valve bluntly triangular; plates long and narrow, gradually tapered to long acute apical portions which are exceeded by the pygofers.

Described from a series of five female and two male specimens collected by the author at Chadburn, NORTH CAROLINA, June 26, 1928. *Holotype* female, *allotype* male and male and female *paratypes* in author's collection.

Arundanus latidens n. sp.

In coloration and general appearance resembling *carolinus* but with distinct female genitalia. Length 5 mm.

Vertex as in *carolinus,* bluntly angled and a little wider between eyes than length at middle.

Color orange yellow, a black line just above and a wavy black line below margin of vertex.

Genitalia: Female last ventral segment with prominent lateral angles, posterior margin concavely, broadly rounded. What appears to be a preceding segment arises at about half the length of the last ventral segment and is strongly produced to form a broad rounded median tooth one-third the width of the segment, which is produced beyond the lateral angles of the last ventral segment and covering its concavity. Male valve obtusely angled, plates long and narrow, gradually tapered to long acutely pointed apices.

Described from a series of eight female and four male specimens collected by the author at Chadburn and Carolina Beach, NORTH CAROLINA, June 22 and 24, 1928. *Holotype* female, *allotype* male and male and female *paratypes* in author's collection.

Arundanus parvulus n. sp.

Resembling *carolinus* in general appearance but smaller with more pointed vertex and with distinct genitalia. Length 4.2 mm.

Vertex more sharply angled than in *carolinus* almost as long on middle as width between the eyes, almost as long as pronotum.

Color: Yellow tinged with orange, a brownish waved line just below margin of vertex and a broken line, usually composed of four rather prominent linear spots just above margin.

Veins of elytra usually paler, faintly margined with fuscous.

Genitalia: Female last ventral segment with prominent rounded lateral angles, posterior margin concavely rounded. What appears to be a preceding segment arises near the base of the last ventral segment and is produced over it, being convexly rounded so that the central half extends over the concavity of the last ventral segment. The apex of this convex portion is broad and truncate or sinuate, sometimes appearing as three indistinct lobes.

Described from a series of sixteen female specimens, one collected at Florence, SOUTH CAROLINA, June 29, 1930, by O. L. Carwright and the others collected at Carolina Beach, NORTH CAROLINA, June 24, 1928, by the author from *Arundinaria tecta*. *Holotype* female and female *paratypes* in author's collection.

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1. BALL, E. D. Can. Ent. 35: 230, 1903.
2. CRUMB, S. E. Anns. Ent. Soc. Amer. 8: 196, 1915.
3. DELONG, D. M. Tenn. St. Bd. Ent. Bul. 17: 82, 1916.
4. DELONG, D. M. Ohio Jour. Sci. 13: 338, 1918.
5. DELONG, D. M. Trans. Amer. Ent. Soc. 52: 91, 1926.

A new record for Archilestes grandis (Odonata: Agrionidae sensu Selysii).

Specimens of *Archilestes grandis* were collected by the writer along Long Run, a small spring-fed stream which empties into the Youghiogheny River between the towns of McKeesport and Versailles, Pennsylvania. A total of twenty-four pairs was taken on the 7, 15, 22, and 23 of September, 1934. In the majority of cases the pairs were easily netted in tandem while ovipositing in the live stems of elderberry (*Sambucus canadensis*) and willow (*Salix* sp.) which overhung the stream. The insects were numerous during the warm hours of mid-day, but disappeared early in the afternoon; the males were more numerous than the females.

This Southwestern genus has already been recorded from at least three states which are without the normal range, besides this Pennsylvania record: C. H. Kennedy informed me that *grandis* was taken at Manhatten, Kansas, by Roger C. Smith in 1920; E. B. Williamson collected it at Oxford, Ohio, in 1927; H. Garman captured twenty-eight specimens near Lexington, Kentucky, in 1929.

The insects collected for this record were identified by both Curator Kahl of the Carnegie Museum of Pittsburgh, Pennsylvania, and Dr. C. H. Kennedy of the Ohio State University of Columbus, Ohio.—CARSTEN AHRENS, McKeesport High School, McKeesport, Pennsylvania.

Notes on the Group Gomphoceri and a Key to its Genera, including one New Genus (Orthoptera, Acrididae, Acridinae).

By Morgan Hebard, Philadelphia, Penna.

Knowing that several Old World species which had long been placed in *Gomphocerus* have in recent years been generically separated, we have felt for some time that the relationships of the New World *Gomphocerus clavatus* Thomas should be investigated. With material of the genotypic species of all the genera concerned except *Dasyhippus,* we are now able to state that it belongs to a new genus, nearest the Old World *Aeropus.*

Examination of the only other New World species which has been referred to that genus, shows that the absence of antennae in the unique type misled its author and that it must be recognized as *Scyllinops meridionalis* (Bruner).[1] That genus, described by Rehn in 1927, has nothing to do with the present group but belongs to the Group Scyllinae.

The first species of the Gomphoceri was described in 1758 and the first genus, *Gomphocerus,* in 1815. Additional genera were proposed by Bolivar in a very brief key,[2] those later described[3] or resurrected[4] by Uvarov having been much more satisfactorily treated.

The Gomphoceri are distinguished by the following characters. Lateral foveolae of vertex elongate, visible from above. Face in profile moderately convex, weakly to more strongly retreating, never vertical. Antennae clubbed distad. Pronotal disk with lateral carinae distinct, percurrent or incomplete, more separated caudad than cephalad; its caudal margin obtuse-angulate produced or truncate. Internal spurs of caudal tibiae not or only moderately unequal in length.

The following key separates the genera which are members of this group.

1. Lateral foveolae of vertex strongly impressed. Pronotal disk with lateral carinae moderately to strongly constricted; its caudal margin weakly to moderately obtuse-angulate produced.

[1] This female, from Cuernavaca, Morelos, Mexico, taken January 4, 1899, by C. C. Deam, is in the author's collection.
[2] Trab. Mus. Nac. Cienc. Nat., Ser. Zool., No. 20, p. 61, (1914).
[3] *Dasyhippus.* Eos, VI, p. 357, (1930).
[4] *Aeropus.* Eos, VII, p. 85, (1931).

Organs of flight fully developed to decidedly reduced but overlapping and with dorsal and lateral fields defined. 2.

Lateral foveolae of vertex very weakly defined. Pronotal disk with lateral carinae straight or showing very weak arcuate convergence. Organs of flight represented by ovate pads (attingent in males, separated in females; their costal margin slightly more strongly convex mesad than elsewhere, their venation forming a quite evenly spaced network. All pronotal carinae coarse, the medio-longitudinal cut caudad of a median point by the weak principal sulcus.[5] *Gomphocerídius* Bolivar, 1914. (Genotype, by original designation, *Acridium brevipenne* Brisout, 1848.)

2. Tegmina with costal margin straight; of males showing no fenestration. Size very small. (Organs of flight slightly reduced [usual] to fully caudate. Pronotal carinae fine, the lateral strongly constricted on prozona and often obsolete at point of nearest approach, the medio-longitudinal cut by the principal sulcus slightly cephalad of a median point.)[6] *Myrmeleotettix* Bolivar, 1914.

(Genotype, by monotypy, *Gomphocerus maculatus* Thunberg, 1815.)

Tegmina with costal margin moderately to decidedly lobate just beyond base; of males beyond showing fenestration between mediastine (which is there marginal) and humeral veins. Size larger. 3.

3. Tegmina with costal margin moderately lobate just beyond base; of males showing weak (narrow) fenestration beyond. (Neither pronotum nor cephalic tibiae ever inflated.) 4.

Tegmina with costal margin strongly lobate just beyond base; of males showing strong fenestration beyond. (Prosterum with tubercle varying from prominent to obsolete.) 5.

4. Cephalic tibiae of male normal. Prosternum not tuberculate. (Pronotal lateral carinae moderately constricted, the medio-longitudinal carina cut by the principal sulcus at or near [rarely well caudad of] a median point. Surface, particularly

[5] The antennae are very short, scarcely longer than the combined length of the head and pronotum in males, shorter in females, but in at least one species of the group we know the antennae to vary from elongate in material from temperate areas to very short in material from boreal areas. Added difficulty in properly distinguishing genera based on brachypterous species lies in the fact that reduction in the organs of flight is usually accompanied by reduction in the degree of production of the pronotal disk even in individuals of the same species.

[6] The ovipositor in this genus, as in *Dociostaurus*, is normally carried retracted to the point that only the apices of the dorsal valves are visible. Though used by Bolivar, we do not think it should be given as diagnostic, as the individual is able to protrude the ovipositor and many dried specimens before us, particularly those which have been stuffed, have the ovipositor projecting quite as much as in those of the related genera.

ventrad, more than normally hirsute.) *Gomphocerus* Thunberg, 1815.

(Genotype, indicated by Samouelle, 1819, confirmed by Kirby 1910, *Gryllus Locusta rufus* Linnaeus, 1758.)

Cephalic tibiae of male very slightly incrassate, with long dense hairs on the ventral surface. Prosternum tuberculate. (Pronotal lateral carinae moderately constricted, the mediolongitudinal carina cut by the principal sulcus well caudad of a median point.) *Dasyhippus* Uvarov, 1930.

(Genotype, by original designation, *Gomphocerus escalerae* Bolivar, 1899.)

5. Fenestration of male tegmina between mediastine (marginal) and humeral veins very strong, that space much wider than that between any others of the longitudinal veins. Cephalic tibiae of male usually normal, locally faintly to strongly inflated. Prozona of male not to distinctly inflated. (Tegmina [normally] slightly reduced to caudate in males, [normally] decidedly more reduced in females except in *variegatus arcticus*.) *Aeropedellus*, new genus. (Genotype, *Aeropedellus clavatus* (Thomas), originally referred to *Gomphocerus*.)

Fenestration of male tegmina between mediastine (marginal) and humeral veins very strong but no wider than and in most of the forms much narrower than the conspicuously defined and fenestrate intercalated area (which lacks an intercalated vein and is crossed by numerous regular and evenly spaced cross-veinlets). Cephalic tibiae of male very strongly to strongly inflated, pear-shaped. Prozona of male very strongly to decidedly inflated. (Tegmina [normally] slightly reduced to caudate in males and showing very slightly greater reduction in females.) *Aeropus* Gistel, 1848.

(Genotype, by monotypy, *Gryllus Locusta sibiricus* Linnaeus, 1767.)

The group divides naturally into three sections. The first of these includes *Myrmeleotettix;* the second *Gomphocerus* and *Dasyhippus* (which without material appears to us to be very closely related); the third (probably) *Gomphoceridius,* (possibly) *Eclipophleps, Aeropedellus* and *Aeropus.*

Of these latter *Gomphoceridius* is known to include a single brachypterous species which is consequently more difficult to associate, as the form and venation of the tegmina are very important in distinguishing the genera of the group.

The position of *Eclipophleps* Tarbinsky 1927 [7] is so uncertain that without material we have considered it best to omit the genus from the above key. The unique female type of *E. bogdanovi* Tarbinsky 1927, from Kobdo, northwestern Mongolia, has the head short and inflated, the eyes very broad, the

pronotum broad with rather strongly convergent lateral carinae, the tegmina represented by pads with rounded apex dorsad, the cephalic limbs thick and short. It is unfortunate that the male is unknown. Nearest this genus may be *Aeropedellus*.

Comparison of the new genus *Aeropedellus* with *Acropus* shows the latter to represent only a decidedly more specialized development of the same branch, the very unusual features so highly developed in the male sex giving a very different facies, but these same features developed much more weakly locally in males of the species of the former. The very conspicuously fenestrate intercalated area of the male tegmina is, however, a striking feature peculiar to *Aeropus*.

To *Gomphoceridius* has been referred only *Acridium brevipenne* Brisout, 1848.

To *Myrmeleotettix* was referred *Gomphocerus maculatus* Thunberg, 1815, by Bolivar in 1914; *Chorthippus antennatus* Fieber, 1853, by Tarbinsky in 1925;[8] *Gomphocerus pallidus* Brunner, 1882, and *Gomphocerus palpalis* Zubovsky, 1900, by Uvarov, Bei-Bienko and Tarbinsky in 1925.

In *Gomphocerus* remain *Gryllus Locusta rufus* Linnaeus, 1758, and *Gomphocerus dispar* Fischer, 1846.

To *Dasyhippus* Uvarov originally (1930) referred *Gomphocerus escalerae* Bolivar, 1899, *Gomphocerus przewalskii* Zubovsky, 1896, *Chorthippus kozhevnikovi* Turbinsky, 1925 and *Chorthippus volgensis* Predtechensky (Zool. Record 1928) and in 1931 Bei-Bienko described *Dasyhippus pygmaeus* and referred to this genus *Chorthippus kozhevnikovi arenosus* Bei-Bienko, 1930.

To *Aeropedellus* we assign *clavatus* (Thomas), 1873 (Synonyms of which are *Gomphocerus carpenterii* Thomas, 1874, and *Gomphocerus clepsydra* Scudder, 1875), *variegatus variegatus* (Fischer), 1846 (synonyms of which are *Gomphocerus reuteri* Miram, 1907 (here assigned) and *Gomphocerus similimus* Ikonnikov, 1911) and *variegatus arcticus* here described.[9]

Uvarov assigned to *Acropus* in 1931 *kudia* (Caudell), 1927, *sibiricus sibiricus* (Linnaeus), 1767, and *sibiricus caucasicus*

[7] Ann. Mag. Nat. Hist., XX, p. 495, figs. A to C.

[8] If a member of this genus, a decidedly aberrant one in the more graceful form, very strongly knobbed antennae in males, less convergent pronotal lateral carinae, caudate organs of flight and decidedly more hirsute surface.

[9] The species *variegatus* and *clavatus* may eventually prove to be Old and New World races of a single holarctic species. The condition with inflated male cephalic tibiae has been named *reuteri* for the former and *carpenterii* for the latter. Appearing locally and not occurring over extensive areas inhabited by these insects, this condition, the cause of which is unknown, we believe is a physiological peculiarity which should not be given nominal recognition.

(Motschulsky), 1840, and described *sibiricus graecus, sibiricus hispanicus, sibiricus pyrenacius, sibiricus helveticus* and *armeniacus.*

The species *Gomphocerus (Stenobothrus) evanescens* Stål, 1860, described from Hong Kong, and *Gomphocerus semicolor* Burmeister, 1838, from Altona, Brazil, are almost certainly not members of the Group Gomphoceri.

(To be continued)

Additional Trypoxylon Names in "Jungle Bees and Wasps of Barro Colorado Island" (Hymen.: Sphecidae).

Significant changes and revisions have lately been made in the genus *Trypoxylon* which will make necessary certain changes of specific names in Chapter V of my "Jungle Bees and Wasps of Barro Colorado Island." Through the work of Richards,* three new species, *Trypoxylon busckii, T. atkinsoni* and *T. vagulum,* are added to the list of wasp fauna of the Island.

I sincerely thank Miss Grace Sandhouse for checking and rechecking the *Trypoxylon* material and supplying me with information necessary to make the following additions and corrections.

Pages 151-155. The wasp whose life history is given under the name *Trypoxylon rugifrons,* has been re-identified as *T. fabricator* Sm. [Sandhouse].

Page 156. The name *T. niveitarse* should be changed to *T. atkinsoni* Richards. The name of *T. cinereum* should be changed to *T. fusipenne* Fab. [Sandhouse], but to make the list complete a paragraph should also be added to the chapter stating that two specimens of *T. cinereum* were taken on the Island in August.

Page 157. The name *T. leucotrichum* Rohwer, is according to Richards, a synonym of *T. palliditarse* Saussure.

Page 158. The *Trypoxylon* wasp referred to under number 7829 is now known as *T. busckii* Richards and No. 7373 is a female of the same species. The wasp referred to as No. 7637 is now known as *T. cornigerum* Cameron [Sandhouse].

Page. 169. The wasp *T.* sp. near *aztecum* proved to be new to science and is now known as *T. vagulum* Richards.

PHIL RAU, Kirkwood, Missouri.

* The American species of the genus Trypoxylon, Trans. Ent. Soc., London 82: 172-362, 1934.

New Coleoptera (Cebrionidae, Buprestidae and Cerambycidae.

By JOSEF N. KNULL, Ohio State University, Columbus, Ohio.

Cebrio convexifrons n. sp. (Cebrionidae).

Dark, brown, resembling *C. mandibularis* Lec. in form, only shorter, moderately pubescent.

Head with front convex, densely punctured, punctures large but not deep; labrum emarginate; mandibles prominent, when closed they leave an open space between them; antennae extending two joints beyond base of pronotum when laid alongside margin, scape stout, second joint about as long as broad, third joint slightly more than half the length of fourth, joints four to ten inclusive gradually decreasing in length, last joint constricted, considerably longer than teeth, joints three to eleven serrate.

Pronotum slightly wider than long, convex; sides broadly rounded in front, then parallel and divergent at base; disk convex, a depression on each side near front margin, lateral margin evident on basal third; surface densely punctured. Scutellum small.

Elytra wider than pronotum, about two and one-half times as long as broad; sides parallel, constricted in middle, apices acutely rounded; surface rugose, with striae rather feebly impressed, punctures of striae and intervals difficult to distinguish.

Abdomen densely punctured, last ventral broadly rounded. Intercoxal process of prosternum very narrow.

Length 13 mm.; width 4 mm.

Male *type* labeled Cleo Springs, OKLAHOMA, July 7, 1934, J. Stankavich, collector, in collection of the writer. *Paratypes* of the same locality, also Cherokee, July 3, and Vinson, Oklahoma, July 7, 1934, J. Stankavitch, collector. These are distributed in the collections of Oklahoma Agricultural and Mechanical College, Ohio State University, Prof. H. C. Fall, and the writer.

This species runs close to *C. separatus* Fall. Prof. Fall kindly compared this species with his type and states that it differs by the strongly roughened and dull surface of the elytra. In *C. separatus* Fall the elytra intervals are thickly puntate, but the punctures are simple and the surface not rugose. The punctuation of both head and thorax is much finer and closer. The front is not so strongly inflexed over the clypeus as it is in *C. convexifrons* Knull.

Agrilus parkeri n. sp. (Buprestidae).

Form robust, cupreous above and beneath, front viridescent. Head convex, slight indication of a median depression on

vertex; surface finely granulose becoming strigate on vertex; front densely pubescent; antennae short, reaching to about middle of pronotum when laid along lateral margin, serrate from the fifth joint.

Pronotum wider than long, widest in middle, slightly wider at base than at apex; sides arcuately rounded in front, sinuate at base, when viewed from the side, marginal and submarginal carinae joined near base, disk flat in middle, a lateral depression on each side, prehumeral carinae strongly elevated; surface coarsely transversely rugose. Scutellum transversely carinate.

Elytra wider than pronotum at base; sides constricted near middle, expanded posteriorly, tips separately rounded, finely serrulate, disk with sutural margins strongly elevated posteriorly; surface imbricately punctate, recumbent pubescence short, forming an indistinct spot on basal and apical third of each elytron.

Abdomen beneath finely punctate, clothed with moderately long pubescence; first segment slightly concave, granulose, second segment somewhat flattened, a line of longer pubescence extending from prosternum to middle of second abdominal segment. Prosternal lobe broadly rounded. Hind coxae with posterior margin distinctly sinuate and with the outer posterior angle more or less acute and somewhat prolonged. Anterior and middle tibiae mucronate on inner margin at apex. Tarsal claws somewhat similar on all feet, cleft, the outer tooth long, the inner one broad and much shorter, not turned inward.

The female allotype differs from the male in having the front of the head cupreous, anterior and middle tibiae unarmed at apex, median line of long pubescence on ventral surface lacking, first two ventrals not modified.

Length 6.3 mm.; width 1.8 mm.

Described from several specimens labeled Chiricahua Mountains, ARIZONA, July 23, 1933, F. H. Parker collector. Male *holotype* in writer's collection, *paratype* in collection of Mr. Parker.

According to Fisher's [1] key this species would run to *A. imbellis* Cr. However, the flattened pronotum will separate these two species. The male genitalia somewhat resemble those figured by Fisher for *A. fallax* Say.

Agrilus neabditus n. sp. (Buprestidae).

Form robust, cupreous above and beneath.

Head convex, median depression extending from epistoma to vertex; surface strigate, lower portion of front clothed with recumbent white pubescence; antennae short, reaching to about

[1] W. S. Fisher, U. S. National Museum Bull. 145, pp. 1-347, 1928.

middle of pronotum when laid along lateral margin, serrate from the fifth joint.

Pronotum convex, longer than wide, widest in front of middle; sides broadly arcuate in front, sinuate near base; when viewed from the side the marginal and submarginal carinae joined near basal fourth; disk convex, a lateral depression on each side, prehumeral carinae moderately elevated; surface coarsely transversely strigate. Scutellum transversely carinate.

Elytra wider than base of pronotum; sides constricted near middle, broadly expanded back of middle, tips separately rounded, serrulate; disk with sutural margins strongly elevated posteriorly; surface imbricately punctate, clothed with short, recumbent pubescence.

Abdomen beneath finely punctate, clothed with short pubescence, first and second segments slightly flattened; a median line of longer pubescence from prosternum to second abdominal segment. Hind coxa with posterior margin arcuately emarginate, outer posterior angle somewhat acute and prolonged. Prosternal lobe broadly rounded. Anterior and middle tibiae mucronate on inner margins at apex. Tarsal claws somewhat similar on all feet, cleft, the outer tooth slightly longer than the inner one; points not turned inward.

The female differs from the male by having the first two abdominals normal, by lacking the median ventral line of longer pubescence and by having the anterior and median tibiae unarmed at apex.

Length 5.7 mm.; width 1.5 mm.

Described from several specimens labeled Base of Pinal Mountains, ARIZONA, July 4, D. K. Duncan, collector. Male *holotype* in writer's collection, *paratype* in collection of Mr. D. K. Duncan.

According to Fisher's [1] key, this species would run to *A. abditus* Horn. However, the genitalia, which somewhat resemble those of *A. egeniformis* Champ. & Knull in outline, will at once separate the two species.

Leptura splendens n. sp. (Cerambycidae).

Resembling *Leptura gigas* Lec. in size and color; piceous, elytra velvety Indian red.

Head densely finely punctured; antennae short, five joints extending beyond base of elytra when they are laid back over dorsal surface, scape stout, second joint wider than long, third joint longer than fourth, fifth joint longer than fourth, joints five to ten inclusive gradually decreasing in length, eleventh joint constricted, slightly longer than tenth, joints five to ten inclusive serrate; surface of antennae clothed with semi-erect

piceous pubescence which is longer and stouter on the first four joints.

Pronotum widest at base, considerably constricted at apex; sides rounded anteriorly to middle, then subparallel to hind angles which are acute; disk with a transverse depression at base and apex, two slight lateral depressions on each side of raised median line; surface densely finely punctured, clothed with piceous pubescence. Scutellum triangular, central part same color as elytra, edges piceous.

Elytra about two and one-half times as long as wide; sides subparallel, broadly rounded posteriorly, apices emarginately truncate; disk convex, each elytron bearing five indistinct costae; surface densely finely punctured, each puncture bearing a semi-erect hair the same color as background.

Ventral surface closely punctured, last dorsal broadly rounded, carinate, last ventral truncate.

Length 22 mm.; width 9 mm.

Type a female labeled Globe, ARIZONA, D. K. Duncan, collector, in writer's collection.

This species resembles *Leptura gigas* Lec. to some extent and should be placed next to it according to the key erected by Swaine and Hopping.[2] However it differs from this species by being less cuneiform; the elytra are more shining, lacking the strongly emarginate apices. The antennae are much shorter and the joints are proportionately shorter. The last dorsal segment lacks the emargination present in the females of *L. gigas* Lec. at hand.

Euderces balli n. sp. (Cerambycidae).

Form, size and color of *Euderces pini* Oliv.; two transverse ivory fasciae in the middle of each elytron. Brunneous, eyes, apical half of elytra and abdomen piceous, posterior legs darkened.

Head rugose; eyes divided, upper lobe much smaller than lower one; antennae reaching the apical fourth of elytra when laid over the dorsal surface, scape stout, second joint slightly longer than wide, third joint nearly as long as fourth and fifth joints united, fourth joint shorter than fifth, joints five to ten inclusive gradually decreasing in length, eleventh joint slightly longer than tenth, inner apical angles of joints three, four and five containing small spines, spines decreasing in length in the order mentioned; head and antennae containing long flying hairs.

[2] J. M. Swaine and Ralph Hopping. Bull. 52, Biological Series, No. 14, National Museum Canada, pp. 1-97, 1928.

Pronotum longer than wide, widest in middle, base constricted more than apex; sides broadly arcuate; disk convex; surface strigate, becoming rugose in center toward base, striae absent along sides and replaced by asperities, smooth area bordering anterior margin, line of dense white semi-erect pubescence bordering the basal margin, long flying hairs covering the entire surface. Scutellum triangular, clothed with dense white pubescence.

Elytra about four times as long as broad, sides parallel on basal half, expanded and broadly rounded posteriorly, apices truncate, bispinose; disk convex, each elytron containing a tuberculiform elevation near suture at base and two transverse sinuate parallel raised white lines, one at middle and the other just in front, white lines not extending to suture or side margins; surface densely coarsely punctured on basal two-thirds, apical third somewhat smoother, a line of short white pubescence on apical third of each elytron extending diagonally from suture to side margin, long flying hairs numerous.

Abdomen moderately punctured, a line of dense white pubescence on each side of first abdominal segment. Femora clavate, legs with scattered flying hairs.

Length 5.8 mm.; width 1.8 mm.

Described from a specimen labeled Baboquivora Mountains, ARIZONA, July 26, E. D. Ball collector. *Holotype* in the collection of the writer.

Some Biological Notes on Sarcophaga bullata Park. (Diptera: Sarcophagidae).

By S. GRAENICHER, South Miami, Florida.

In a previous paper the present writer [1] pointed to *Sarcophaga bullata* Park. as the most common and most important scavenger among the Sarcophaginae of the Miami region. It had appeared in breedings from 28 dead animals and human excrement oftener than the remaining 10 species of Scarcophaginae dealt with in that paper taken together. Since that time the following six species: *S. bishoppi* Aldr., *deceptiva* Aldr., *assidua* Wlk., *quadrisetosa* Coq., *johnsoni* Aldr., *hillifera* Aldr. have been added to the Miami list, none of which had figured in the experiments referred to above.

Competition. A considerable number of insects depend on decaying animal matter as food during the larval stage, and as a result of the severe competition the food supply is occasion-

[1] S. Graenicher. Some observations on the biology of Sarcophaginae. ENT. NEWS 42, 227-230 (1931).

ally exhausted before all of the occupants have reached their full development. Unless such underfed larvae happen to strike another food supply, which is usually not the case, they either perish or develop into small-sized adults. In *S. bullata*, for example, the length ranges according to Aldrich[2] from 7½ mm. to 15 mm. There are 2 species of flies in our region, *Lucilia sericata* Meig. and *Cochliomyia macellaria* Fab. (Screw-worm fly) which are scavengers of first importance. Much information on the habits and life history of both has been furnished by Bishopp.[3] Of *L. sericata* he states that "as soon as an animal is skinned they begin feasting on the blood and fresh carcass." The writer had a similar experience with *Cochliomyia macellaria*, the second species named above. A dead rat, still in fresh condition, was exposed at 9 A. M. after its abdomen had been cut wide open. Several specimens of *Cochliomyia* appeared without delay. Both of the species have been bred repeatedly together with *Sarcophaga bullata* from dead rats, snakes, fish, pieces of beef, etc. Two bluejays exposed within 24 hours of each other under the same conditions brought rather one-sided results:

Bluejay No. 1, exposed Sept. 30 (killed Sept. 29).

Oct. 2. Full of larvae. Placed in a closed can with moist soil on the bottom. From the puparia numerous ♂ and ♀ *Lucilia sericata* made their appearance from Oct. 9 to Oct. 12. No other species was represented.

Bluejay No. 2, exposed Oct. 1 (killed Sept. 30).

Oct. 4. Larvae larger but not as numerous as those in bluejay No. 1. Oct. 11. One ♂ *L. sericata* (the only one) appeared. From Oct. 16 to 18 a total of 194 *Sarcophaga bullata* (101 ♂, 93 ♀) were obtained.

Attraction to certain chemical substances. In an article dealing with the attraction of Diptera to ammonia Richardson[4] cites Howlett as having "induced a species of *Sarcophaga* to deposit larvae in a flask containing a solution of skatol, a compound present in the feces of many animals." The results obtained from the following exposures add some information on the subject.

[2] J. M. Aldrich. Sarcophaga and Allies in North America, p. 234.
[3] F. C. Bishopp. Insect control about abattoirs and packing houses. Journ. Econ. Ent. 10, 269 (1917).
[4] C. H. Richardson. The attraction of Diptera to ammonia. Ann. Ent. Soc. Ac. 9, 408-413 (1916).

Oct. 2. Two fruit jars (quart size) with glass covers over the top were exposed in the open between fruit trees about 100 ft. apart. The covers prevented flies from entering but gave primary larvae free access through the very narrow space between the cover and the rim of the jar. A portion of a dead snake at the bottom of each jar served as bait.

Oct. 3. A number of larvae inside of each jar. A ♀ *Sarcophaga bullata* was observed depositing larvae on the outside of one of the jars near the top, as also 1 to 1½ inches below the top. In the evening the contents of both jars were brought together in a closed can with moist earth covering the bottom. From Oct. 16-20 145 *S. bullata* (64 ♂, 81 ♀ and 1 ♂ *S. bishoppi* made their appearance.

From a third jar of the same kind exposed Oct. 4 in the same surroundings 39 *S. bullata* (10 ♂, 29 ♀) were obtained. It will be noted that of all the species of *Sarcophaga* on the wing at that time of the year *S. bullata* stands foremost in depositing the larvae under such conditions. *S. bishoppi,* of which 1 specimen figured in the results, is a much rarer species in this region than *S. bullata.*

Kennedy [5] states that "in the sense of smell many insects are superior to vertebrates," and in this connection he mentions the fact that some of the moths smell their mates from a distance of a mile. The results obtained with the fruit jars, as described above, lead to the conclusion that the larvipositing females of *S. bullata* are guided by an acute olfactory sense which enables them to detect the presence of decaying animal matter inside of a jar, the cover of which permits only a limited amount of the putrid odor to escape.

The flowers of certain plants are foul-scented and for this reason attractive to flies of the scavenger type. Such flowers have been called sapromyiophilous flowers. The papaw of the southern states (*Asimina triloba* Dunal) extends its range into southern Illinois where Robertson [6] found nine species of flies visiting the flowers, seven of which were flies usually attracted by decaying substances. In the surroundings of Milwaukee, Wisconsin, the writer's former residence, three species of

[5] C. H. Kennedy. Some non-nervous factors that condition the sensitivity of insects to moisture, temperature, light and odors. Ann. Ent. Soc. Am. 20, 87-106 (1927).

[6] Chas. Robertson. Flowers and insects. Trans. Acad. Sc. St. Louis 7, 154-155.

Smilax are of common occurrence. The small greenish flowers of all three agree in size and structure, they differ however in the odor. One of them, *S. hispida* Muhl., is sweet-scented, while the other two are sapromyiophilous and in the vernacular are known as carrion-flowers. The writer [7] captured 53 insects at the flowers of *S. ecirrhata S. Wats.*, one of the carrion-flowers, 35 of which (66%) were flies of scavenger habits. For *S. herbacea L.*, the other carrion-flower, 28 (53.8%) out of a total of 52 visitors were flies of scavenger habits. On the other hand *S. hispida* with the sweet-scented flowers had only 14 (35%) out of 40 visitors that were flies of scavenger habits.

Resistance to low temperatures. The temperatures prevailing in this part of southern Florida make it possible for the flies under consideration to carry on their activities throughout the year with only an occasional interference by a drop in the temperature which is usually of short duration. On one such occasion the writer witnessed the effects of the lowered temperature on larvae and adults, an account of which is given in the following notes.

Sarcophaga No. 61, April 5, 1931, 9:30 A. M. Numerous larvae feeding on a dead snake exposed on a table inside of a slat house. April 7. Slow development on account of cool weather; the night before last the temperature went down to 50° F., last night to 46° F. April 8, 6 A. M. Temperature 46° F., sunrise at 6:05. Larvae very sluggish, not feeding, some of them crawling on the outside of the snake. At 7:30 A. M. temperature up to 52° F. Two adults of *Sarcophaga* sp. and 2 of *Lucilia sericata* flying nearby. At 9 A. M. temperature up to 58° F.; the following flies had been caught up to this time: several *Lucilia sericata*, 2 ♂ *Sarcophaga singularis*, 3 ♂, 1 ♀ *S. floridensis*, 1 ♀ *S. bullata* (containing primary larvae). Around 11 A. M. 2 ♂, 1 ♀ *S. bullata*, 1 ♂ *S. floridensis*, 1 ♂ *S. bishoppi* were taken. Temperature at noon 78° F. April 9, 6 P. M. Larvae well developed, placed in moist earth. From these 83 puparia were obtained; from the latter 77 adult *S. bullata* (43 ♂, 34 ♀) came forth April 30, May 1 and 2.

Neither the adults on the wing at 52° F. nor the larvae which had been exposed to low temperatures (down to 46° F.) during 3 successive nights showed any serious consequences. The larvae were somewhat retarded in their development, the adults produced from them, however, were normal both in size and the characteristic structures of the species.

[7] S. Graenicher. Flowers adapted to flesh-flies. Bull. Wis. Nat. Hist. Soc. 2, 29-38 (1902).

Entomological Literature

COMPILED BY LAURA S. MACKEY UNDER THE SUPERVISION OF E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, heft, &c. the latter within ( ) follows; then the pagination follows the colon :

All continued papers, with few exceptions, are recorded only at their first installments.

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

Papers published in the Entomological News are not listed.

New Titles of Periodicals and Serials Referred to

3. Annales Sci. Naturelles, Zoologie, Paris.
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This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

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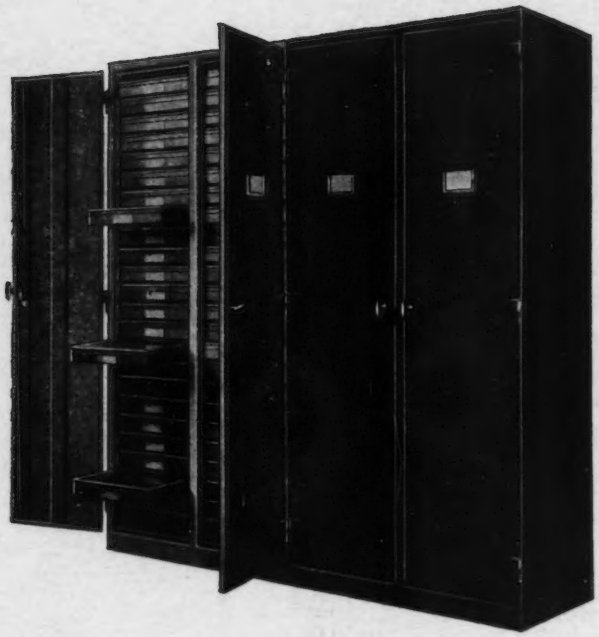

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